GEORGIA INSTITUTE OF TECHNOLOGY — OFFICE OF CONTRACT ADMINISTRATION

PROJECT ADMINISTRATION DATA SHEET

[x] ORIGINAL [ ] REVISION NO. _____

Project No. A-3231 DATE 5/7/82

Project Director: John Moskaluk # 2360 ~~School~~/Lab EDL/BDD

Sponsor: Department of Transportation, State of Georgia

Type Agreement: Contract No. 2, DOT Project No. 8001 (under FHA Prime)

Award Period: From 4/13/82 To 5/12/83 (Performance) 5/12/83 (Reports)

Sponsor Amount: $28,396 Contracted through:

Cost Sharing: _____ GTRI/~~GSIT~~

Title: Georgia Intercity Bus System

ADMINISTRATIVE DATA OCA Contact Faith G. Costello

1) Sponsor Technical Contact:

Same as 2)

2) Sponsor Admin/Contractual Matters:

X Tom Stapler
Department of Transportation
State of Georgia
Office of Materials and Research
15 Kennedy Drive
Forest Park, GA 30050
Phone: 363-7567

Defense Priority Rating: _____ Security Classification: _____

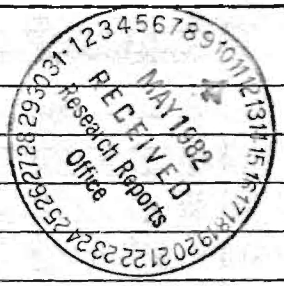
RESTRICTIONS

See Attached _____ Supplemental Information Sheet for Additional Requirements.

Travel: Foreign travel must have prior approval – Contact OCA in each case. Domestic travel requires sponsor approval where total will exceed $50 and is limited to travel within the State of Georgia. ~~$500 or 125% of approved proposal budget category.~~

Equipment: Title vests with Sponsor; however, none proposed

COMMENTS:



COPIES TO:

Research Admin. Ntwk.
~~Administrative Coordinator~~
Research Property Management
Accounting
Procurement/EES Supply Services
Research Security Services
~~Reports Coordinator~~ (OCA)
Legal Services (OCA)
Library
EES Public Relations (2)
Computer Input
Project File
Other _____

FORM OCA 4:781

GEORGIA INSTITUTE OF TECHNOLOGY OFFICE OF CONTRACT ADMINISTRATION

SPONSORED PROJECT TERMINATION/CLOSEOUT SHEET

Slave 2 SP-118

Date 11/8/85

Project No. A-3231 ~~School~~/Lab EDL/BDD

Includes Subproject No.(s) N/A

Project Director(s) John Moskaluk GTRC / ~~GIT~~

Sponsor Dept. of Transportation of GA

Title Georgia Intercity Bus System

Effective Completion Date: 5/12/83 (Performance) _____ (Reports)

Grant/Contract Closeout Actions Remaining:

- [ ] None
- [X] Final Invoice or Final Fiscal Report
- [ ] Closing Documents
- [X] Final Report of Inventions
- [X] Govt. Property Inventory & Related Certificate
- [ ] Classified Material Certificate
- [ ] Other _____

Continues Project No. _____ Continued by Project No. _____

COPIES TO:

Project Director
Research Administrative Network
Research Property Management
Accounting
Procurement/GTRI Supply Services
Research Security Services
Reports Coordinator (OCA)
Legal Services

Library
GTRC
Research Communications (2)
Project File
Other M. Heyser; A. Jones; R. Embry

FORM OCA 69.285

A-3231

RESEARCH QUARTERLY PROGRESS REPORT
GEORGIA DEPARTMENT OF TRANSPORTATION

Date of Report: 7/23/82

1 Project No. State/Agency	2 Project Title	3 Quarterly Report No. / From / To
8001	Georgia Intercity Bus System	No. 1 From 2 April 1982 To 30 June 1982

4 Research Agency	5 Project Director(s)
Georgia Institute of Technology Engineering Experiment Station Atlanta, Georgia 30332	M. John Moskaluk

6 Starting Date	7 Completion Date	8 % Time Expended	9 Schedule Status	10 Sufficiency of Funds
2 April 1982	2 May 1982	30	☐ Ahead ☐ Behind ☒ On	☒ Sufficient ☐ Insufficient

Funds Authorized		Funds Expended				
11 Total	12 Current Fiscal Year	13 Total to Date	%	14 Current Fiscal Year	%	15 Report Quarter
$28,396.00		$13,291.96	46	$13,291.96	46	$13,291.96

16 Project Schedule Research Tasks	Time Period	% Task Completed
Overall % Completed		

☐ Approved Schedule ■ Work Completed Schedule ▨ Projected Completion Schedule

17 Progress This Quarter (By Task) TASK 1.0: "Develop Intercity Bus Data"

- o Ticket survey has been completed and data tape received.
- o Terminal survey has been completed and data tape received in December, 1981.
- o Mail-out survey completed and data tape received in January, 1982.

This task is 100% complete.

TASK 2.0: "Review, Check, and Summarize Data"

- o Ticket survey data have been summarized and bug-fixed.
- o Terminal survey data have been summarized and bug-fixed.
- o Mail-out survey data have been summarized and bug-fixed.

This task is 100% complete.

TASK 3.0: "Refine, Calibrate, and Validate the Predictive Process"

- o Conduct literature review.
- o Prepare cross-tabulations of data.
- o Add other data to base data such as population, time, and distance paths.
- o Prepare data to run SPSS multi-regression analysis.

This task is 75% complete.

TASK 4.0: "Test Predictive Process"

- o Prepare calibration data and comparative data by corridor.

This task is 20% complete.

TASK 5.0: "Evaluate the Intercity Bus System"

No work on this task.

TASK 6.0: "Document Results, Recommendations, and Conclusions"

Prepare routine project documentation and data summary report submitted to GDOT.
This task is 50% complete.

18 Work Planned for Next Quarter

Complete calibration and testing of model.

Begin evaluation of intercity bus system if model predictability is adequate.

19 Significant Technical Information, Recommendations, Implementation

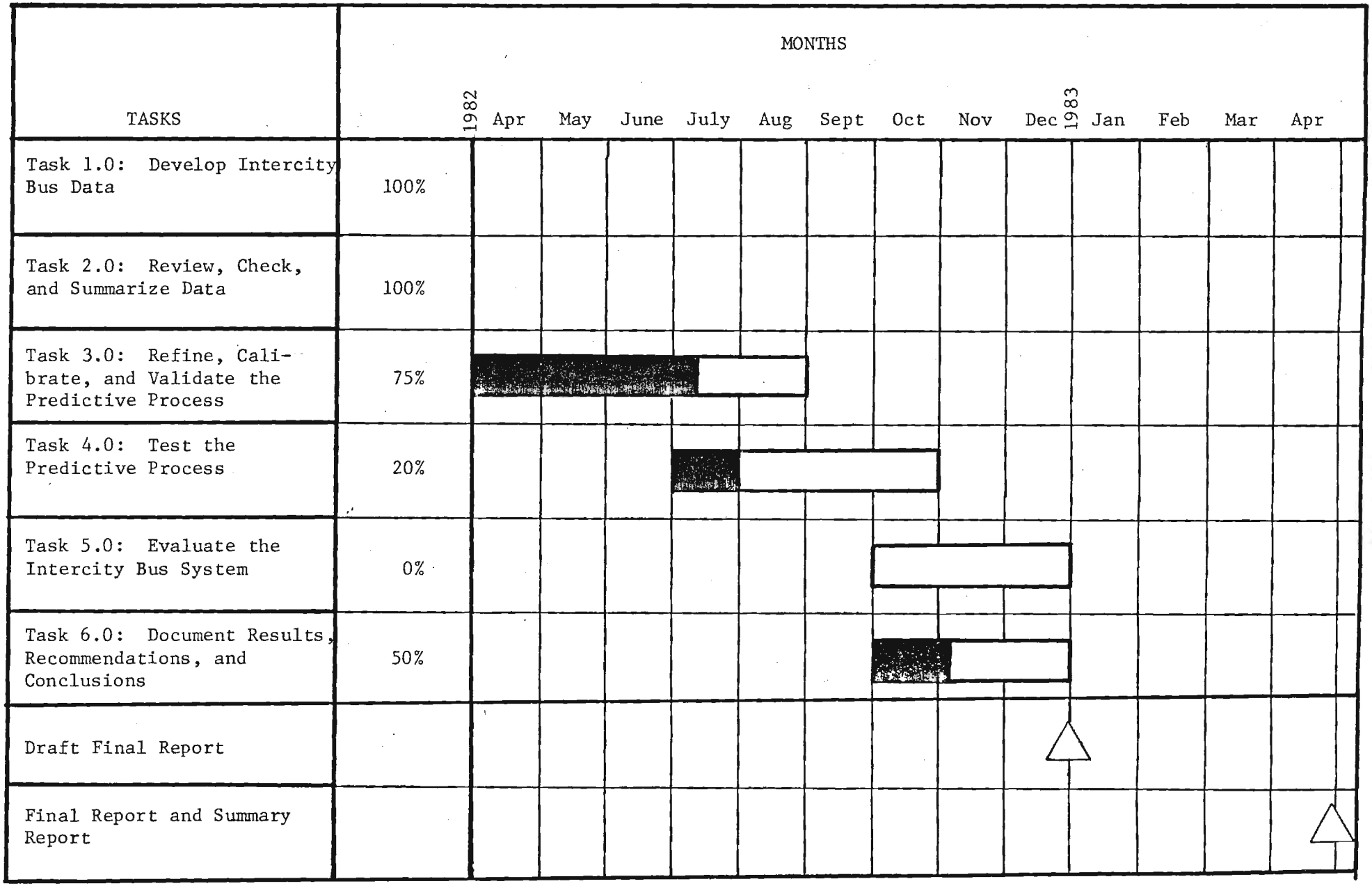
Data summary report of graphs and tables was submitted to GDOT.

20 Problems

21 Report Prepared by

Signature	M. John Moskaluk	Senior Research Engineer
	Name	Title

PROJECT SCHEDULE: Georgia Intercity Bus System



A-3231

RESEARCH PROGRESS REPORT
GEORGIA DEPARTMENT OF TRANSPORTATION

Date of Report: 11/1/82

1 Project No. State/Agency	2 Project Title	3 Report No. / From / To
8001	GEORGIA INTERCITY BUS SYSTEM	No. 9 From 30 June 1982 To 30 Sept. 1982

4 Research Agency	5 Project Director(s)
GEORGIA INSTITUTE OF TECHNOLOGY ENGINEERING EXPERIMENT STATION ATLANTA, GEORGIA 30332	M. John Moskaluk

6 Starting Date	7 Completion Date	8 % Time Expended	9 Schedule Status	10 Sufficiency of Funds
August 11, 1980	May 12, 1983	80	☐ Ahead ☐ Behind ☒ On	☒ Sufficient ☐ Insufficient

Funds Authorized		Funds Expended				
11 Total	12 Current Fiscal Year	13 Total to Date	%	14 Current Fiscal Year	%	15 Report Period
$80,483.70	$50,000	72,597.50	90	$47,268.50	95	$7,217.50

16 Project Schedule

Research Tasks	Time Period	% Task Completed
Overall % Completed		

☐ Approved Schedule ■ Work Completed Schedule ▨ Projected Completion Schedule

17 **Progress This Report Period (By Task)**

TASK 1.0: "Develop Intercity Bus Data"
This task is 100% complete; no work on this task this quarter.

TASK 2.0: "Review, Check and Summarize Data"
This task is 100% complete; no work on this task this quarter.

TASK 3.0: "Refine, Calibrate and Validate the Predictive Process"
Prepare data for regression analysis
Obtain distance data from statewide network
Generate regression demand model
This task is 95% complete

TASK 4.0: "Test Predictive Process"
Conducted Validation tests on regression model
Preliminary conclusion is that population alone is not sensitive enough to produce accurate predictions
This task is 60% complete

TASK 5.0: "Evaluate the Intercity Bus System"
No work on this task

TASK 6.0: "Document Results, Recommendations and Conclusion"
Prepare routine documentation and meet with GDOT
This task is 70% complete.

18 **Work Planned for Next Report Period**

Complete the work on building a model and complete the remainder of the project.

19 **Significant Technical Information, Recommendations, Implementation**

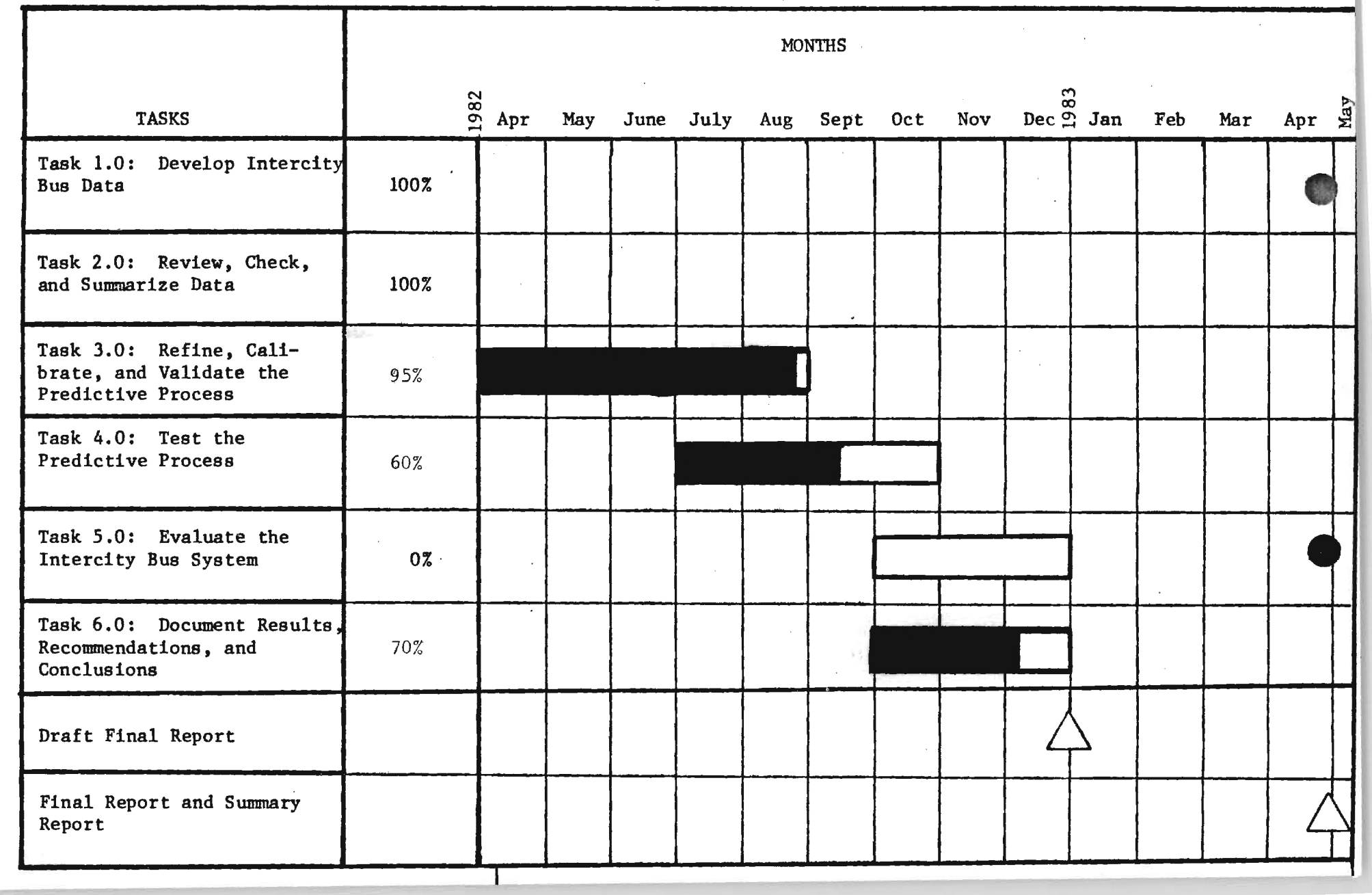
Regression analysis using direct demand modeling does not appear to produce a satisfactory model.

20 **Problems**

21 Report Prepared by

Signature	M. John Moskaluk	Senior Research Engineer
	Name	**Title**

PROJECT SCHEDULE: Georgia Intercity Bus System



A-3231

RESEARCH PROGRESS REPORT
GEORGIA DEPARTMENT OF TRANSPORTATION

Date of Report: 1/24/83

1 Project No. State/Agency	2 Project Title	3 Report No. / From / To
8001	Georgia Intercity Bus System	No. 10 From 30 Sept 1982 To 31 Dec 1982

4 Research Agency	5 Project Director(s)
Georgia Institute of Technology Engineering Experiment Station Atlanta, GA 30332	M. John Moskaluk

6 Starting Date	7 Completion Date	8 % Time Expended	9 Schedule Status	10 Sufficiency of Funds
August 11, 1980	May 12, 1983	95	☐ Ahead ☐ Behind ☒ On	☒ Sufficient ☐ Insufficient

Funds Authorized		Funds Expended				
11 Total	12 Current Fiscal Year	13 Total to Date	%	14 Current Fiscal Year	%	15 Report Period
80,483.70	$50,000	$77,158.93	96%	$51,829.93		4561.43

16 Project Schedule Research Tasks	Time Period	% Task Completed
Overall % Completed		

☐ Approved Schedule ■ Work Completed Schedule ▨ Projected Completion Schedule

17 **Progress This Report Period (By Task)**

Task 1.0: - "Develop Intercity Bus Data" - 100% complete; no work

Task 2.0: - "Review, Check and Summarize Data" - 100% completed; no work

Task 3.0: - "Refine, Calibrate and Validate the Predictive Process" - 100% complete, model was developed with a reasonable R^2 but the model did not prove to be predictive.

Task 4.0: - "Test Predictive Process" - 100% complete, model could predict travel with reasonable accuracy.

Task 5.0: - "Evaluate the Intercity Bus System" - No work on this task. Task dropped because of model failure.

Task 6.0: - "Document Results, Recommendations and Conclusions" - Preparing final report. Task is 80% complete.

18 **Work Planned for Next Report Period**

Finish and submit final report.

19 **Significant Technical Information, Recommendations, Implementation**

Presented project results at meeting with Mr. James Stanley.

20 **Problems**

21 Report Preparation

Signature	M. John Moskaluk	Senior Research Engineer
	Name	**Title**

A-3231

RESEARCH PROGRESS REPORT
GEORGIA DEPARTMENT OF TRANSPORTATION

Date of Report: May 3, 1983

1 Project No. State/Agency	2 Project Title	3 Report No. / From / To
#8001	Georgia Intercity Bus System	No. 11 From January 1983 To March 1983

4 Research Agency	5 Project Director(s)
Georgia Institute of Technology Atlanta, GA 30340	M. John Moskaluk

6 Starting Date	7 Completion Date	8 % Time Expended	9 Schedule Status	10 Sufficiency of Funds
August 11, 1980	May 12, 1983	100%	☐ Ahead ☐ Behind ☒ On	☒ Sufficient ☐ Insufficient

Funds Authorized		Funds Expended				
11 Total	12 Current Fiscal Year	13 Total to Date	%	14 Current Fiscal Year	%	15 Report Period
$80,483.70	$50,000	$80,483.70	100	$55,154.60	100	$3,324.77

16 Project Schedule Research Tasks	Time Period	% Task Completed
Overall % Completed		

☐ Approved Schedule ■ Work Completed Schedule ▨ Projected Completion Schedule

17 **Progress This Report Period (By Task)**

All Tasks Completed

Draft Final Report Submitted to GDOT

18 **Work Planned for Next Report Period**

Submit Final Report

19 **Significant Technical Information, Recommendations, Implementation**

20 **Problems**

21 Report Prepared by

Signature	M. John Moskaluk	Senior Research Engineer
	Name	**Title**

A-3231

RESEARCH PROGRESS REPORT
GEORGIA DEPARTMENT OF TRANSPORTATION

Date of Report: 1/24/83

1 Project No. State/Agency	2 Project Title	3 Report No. / From / To
8001	Georgia Intercity Bus System	10 / From 30 Sept 1982 / To 31 Dec 1982

4 Research Agency	5 Project Director(s)
Georgia Institute of Technology Engineering Experiment Station Atlanta, GA 30332	M. John Moskaluk

6 Starting Date	7 Completion Date	8 % Time Expended	9 Schedule Status	10 Sufficiency of Funds
August 11, 1980	May 12, 1983	95	☐ Ahead ☐ Behind ☒ On	☒ Sufficient ☐ Insufficient

Funds Authorized		Funds Expended				
11 Total	12 Current Fiscal Year	13 Total to Date	%	14 Current Fiscal Year	%	15 Report Period
80,483.70	$50,000	$77,158.93	96%	$51,829.93		4561.43

16 Project Schedule Research Tasks	Time Period	% Task Completed
Overall % Completed		

☐ Approved Schedule ▬ Work Completed Schedule ▨ Projected Completion Schedule

17 Progress This Report Period (By Task)

Task 1.0: - "Develop Intercity Bus Data" - 100% complete; no work

Task 2.0: - "Review, Check and Summarize Data" - 100% completed; no work

Task 3.0: - "Refine, Calibrate and Validate the Predictive Process" - 100% complete, model was developed with a reasonable R^2 but the model did not prove to be predictive.

Task 4.0: - "Test Predictive Process" - 100% complete, model could predict travel with reasonable accuracy.

Task 5.0: - "Evaluate the Intercity Bus System" - No work on this task. Task dropped because of model failure.

Task 6.0: - "Document Results, Recommendations and Conclusions" - Preparing final report. Task is 80% complete.

18 Work Planned for Next Report Period

Finish and submit final report.

19 Significant Technical Information, Recommendations, Implementation

Presented project results at meeting with Mr. James Stanley.

20 Problems

21. Report p[illegible]

Signature

M. John Moskaluk
Name

Senior Research Engineer
Title

A-3231

RESEARCH PROGRESS REPORT
GEORGIA DEPARTMENT OF TRANSPORTATION

Date of Report: May 3, 1983

1 Project No. State/Agency	2 Project Title	3 Report No. / From / To
#8001	Georgia Intercity Bus System	No. 11 From January 1983 To March 1983

4 Research Agency	5 Project Director(s)
Georgia Institute of Technology Atlanta, GA 30340	M. John Moskaluk

6 Starting Date	7 Completion Date	8 % Time Expended	9 Schedule Status	10 Sufficiency of Funds
August 11, 1980	May 12, 1983	100%	☐ Ahead ☐ Behind ☒ On	☒ Sufficient ☐ Insufficient

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$80,483.70	$50,000	$80,483.70	100	$55,154.60	100	$3,324.77

16 Project Schedule Research Tasks	Time Period	% Task Completed
Overall % Completed		

☐ Approved Schedule ▨ Work Completed Schedule /// Projected Completion Schedule

17 Progress This Report Period (By Task)

All Tasks Completed

Draft Final Report Submitted to GDOT

18 Work Planned for Next Report Period

Submit Final Report

19 Significant Technical Information, Recommendations, Implementation

20 Problems

21 Report Prepared by

Signature	M. John Moskaluk	Senior Research Engineer
	Name	Title

COOPERATIVE RESEARCH
GDOT RESEARCH PROJECT NO. 8001
GEORGIA INTERCITY BUS SYSTEM

DRAFT
FINAL REPORT

GEORGIA INTERCITY BUS SYSTEM

By
M. John Moskaluk
Project Director
Engineering Experiment Station
Georgia Institute of Technology

Prepared for

Department of Transportation
State of Georgia
in cooperation with
U.S. Department of Transportation
Federal Highway Administration

March 1983

TABLE OF CONTENTS

TABLE OF FIGURES

This report Technology effort in
developing a pred ty bus system.
Included in this i dology employed,
a summary of the c odel development and
conclusions.

Background

There is a gr in the mobility that
exist in the rural gia. The Georgia
Department of Trans e need to furnish
transportation syst throughout the
state to meet the social and economic demands of public through adequate transportation. Today, the predominant means of intercity mobility is the private automobile on public highways. People can afford to purchase and operate an automobile decisively prefer this mode of travel. Individuals who cannot afford or are unable to operate are limited to some other form of transport, e.g. air, rail, bus, taxi or travel with a friend. For those in Georgia who must rely on intercity bus transportation to meet their mobility needs, the deficiencies in service are of paramount concern. Previous and continuing reductions in service has had and will have the greatest impact in rural areas, where travel via bus in some corridors has become greatly restricted or even nonexistent. This critical situation is the result of steadily declining demand and continued increases in operating costs.

The American Bus Association has stated that because of declining population in rural areas and the inability of rural inhabitants to pay

bus fares that are commensurate with actual cost, the industry can no longer provide essential public service in rural areas without financial assistance. The U.S. Congress has responded with the Surface Transportation Assistance Act of 1978 (Public Law 95-599). Included in the Act are Sections 21 and 22 aimed directly at intercity bus service and Section 18 the Formula Grant Program for areas other than urbanized areas. Realistically, however, it appears that there will be no dedicated funds for the intercity in the near future. Instead, it is most likely that any assistance will have to be considered along with other projects and sought with the understanding that some economic tradeoff must be made.

The GDOT has recognized these tradeoffs and has acknowledged the need to have continued intercity bus service at a reasonable level. They like others are faced with the problem of how to develop the best intercity bus system with limited resources. This study exists so that appropriate information is available to help answer this question.

Project Objectives

The overall objective of the research project is to refine, calibrate and validate a predictive process that simulates and/or forecasts demand of intercity bus travel for the State of Georgia. The specific goal is the development of the predictive process.

This goal was only partly achieved. A model was developed, as explained later, but it did not predict travel with realibility. The model achieved a high coefficient of regression with limited independent variables but it failed when it was used to predict travel demand in the test corridor.

The second goal of project was to collect intercity bus travel data for the Georgia system. Tremendous effort was put forth by all parties in the study to generate a usable data.

It is essential to realize that the data developed can be most helpful to the GDOT in their analysis and recommendations of a continuing intercity bus system for the state. This information file provides data concerning the level of travel demand, the time of travel, the socio-economic characteristics of the traveler, and the origin/destination of the traveler. Analyses of these data will indicate how best to alter the existing service to achieve the best possible system with limited resources. This data base has been given to the GDOT under separate cover.

Overview of the Final Report

This research project began in August 1980. A data summary report was submitted to the GDOT in May 1982. The results and conclusions of this research were presented to the GDOT in October 1982. All of this information is included in this report.

The report covers two major areas: Section II Research Methodology and Section III Data Summary. Results and conclusions are given in Section IV. A brief discussion of model development is contained in Section II. Since the model did not prove to be a good predictor, the discussion is constrained to the efforts devoted to model development and testing.

II RESEARCH METHODOLOGY

The research methodology is divided into two phases: Data Collection and Model Development. The information obtained from the data collection effort form the analytical basis for model development. Other data sources such as the GDOT statewide network, the 1980 Census and data collected in the previous "Georgia Intercity Bus System Evaluation" study were used to augment the data collected.

Data Collection

Data from three sources have been collected. Origin/destination data were collected from the headquarter officer of Greyhound, Trailways and Southeastern Stage. Terminal data (socio-economic patronage data) were collected from intercity bus passengers in Atlanta and Macon, Georgia. The third form of data was obtained from a mail-out survey. The mail-out data collected via a questionnaire concerned travel patterns, travel mode and socio-economic information. The data are extensive and it is suggested that other agencies within GDOT review the data base for possible utilization.

The first step of the data collection effort involved dividing the state into four major corridors. The purpose of the corridors is for model building. Three corridors were eventually defined as model development corridors and the fourth was used to test the predictive capability of the model. All data collection efforts were confined to these four corridors.

Origin/Destination Data. With permission from the carriers, GDOT and Georgia Tech personnel went to the headquarter office of these carriers. They tabulated ticket data for a designated two-week period

of time. This ticket data can be interpreted into origin/destination information if the ticket collection rules of each carrier are observed. Financial information was also collected so that origin/destination data could be expanded to represent a one year period.

Most of the data were collected during 1981 so that this calendar year became the basis for estimating annual patronage. From the terminal data collected and from the financial trend data, it is estimated that there were 671,200 originating intercity bus passengers in 1981.

Terminal Data. The second form of data collected was through passenger interviews conducted in Atlanta and Macon at the Greyhound and Trailways terminals. Passengers were interviewed both as they boarded and left the bus. The survey was conducted for one week, twenty-four hours per day. Approximately 3,200 interviews were conducted.

Information obtained include origin/destination, mode of access/egress to terminal, age, sex, frequency of trips, trip purpose, income, occupation and drivers license. This information is summarized in the next section.

A typical interview was conducted by the interviewer approaching the passenger and asking if he/she would participate in the interview. If yes, the interviewer notated the sex of the individual and proceeded with the questions. An average interview time was five minutes and approximately 82% of the individuals passing through terminals traveling the designated corridors were interviewed. Scheduled information was obtained from the terminal managers rather than the Russell's Guide so that the most up-to-date schedule by carrier was available.

Mail-out Survey. A mail-out survey was undertaken to obtain information about travel patterns and modal split. Because of budget constraints,

an upper mailing limit of 50,000 was decided upon. This number was equally spread among the 66 counties based on population. A further limit of not more than 25 percent of the total mailing would go to the counties in the Atlanta area. For all counties except those in the Atlanta area, addresses were randomly selected from county telephone books. In Atlanta, the tax digest was used to select addresses.

A total mailing of 44,000 with 11,800 to the Atlanta were sent out. Both time and dollars caused a reduction in the questionnaires sent. A total of 5,400 questionnaires were returned and judged satisfactory for inclusion. Approximately 200 questionnaires were thrown out because of apparent bad data or neglect in completing pertinent questions.

Of the three data collection forms, the mail-out survey proved to be the most costly. The time required to prepare and mail the survey and then to summarize the data far exceeded the original estimates. However, the data collected provides a wealth of information about intercity travel for all modes in the state of Georgia. The user is cautioned because the data is not statistically representative at a high level of confidence. Further, the data may have an undesirable bias because telephone directories and tax digest were used to determine addresses. It is obvious that those residents without telephones, estimated to be about 10 percent, would not have received a questionnaire; therefore, they are excluded from the survey and results.

Model Development

The model developed under this research did not prove to be an effective tool in predicting intercity bus demand based on the data collected.

After discussing with GDOT the availability of the data types and their preference of model construction, it was mutually decided that a stepwise multi-regression analysis was the most applicable.

The procedure used to develop the model followed the steps outlined below:

1. Select three corridors in which data were collected to develop the model.

2. Define a wide array of independent variables from which demand would be estimated.

3. Perform a correlation analysis among the independent variables and delete those that were highly correlated. Variables particularly well correlated with demand are:

   City Population: partial correlation coefficient = 0.98
   Area Population: partial correlation coefficient = 0.86
   Route Distances: partial correlation coefficient = 0.83
   Buses per Day: partial correlation coefficient = 0.84

4. Perform the step-wise regression analysis and analyze the results.

5. Use the model developed in the fourth corridor to determine the predictive capabilities of the model.

6. Make a determination if the model defined is a usable tool for predicting intercity bus passenger demand.

The corridors used in the study are:

Atlanta to Chattanooga - Corridor A
Atlanta to Augusta - Corridor C
Atlanta to Columbus - Corridor D
Macon to Lake City, Florida - Corridor B

The first attempt to develop a model used corridors A, C, and D as the development corridors. Corridor B was used as the test or verification corridor. Another attempt included corridors A, B and C for development with corridor D as the verification corridor. Corridors C, D and B were used for development and corridor A as the test corridor. All models developed indicated that the same two independent variables (city population

and route distance) explained the greatest variation in demand. The best models developed used corridors A, D and B with corridor C for verification. Formulation of these models are:

Development Corridors A, D and B

All Cities

$$ICBD = 0.5563\ (CITPOP) - 1632 \qquad R^2 = 0.93$$

Prediction Capability:
Overestimates intercity bus demand
by 70 to 180 percent

Individual Cities

$$ICBD = 0.4891\ (CITPOP) - 0.1879\ (ROUTDIS) + 1.3418 \qquad R^2 = 0.96$$

Prediction Capability:
Overestimates intercity bus demand
by 40 to 130 percent

where ICBD is intercity bus demand

Other models had a prediction capability of minus 150 percent to plus 200 percent. Obviously, the above models are sensitive to city population but are not sensitive to other parameters such as service levels. The reader is cautioned that the reliability of models is questionable and the use of them could lead to extremely erroneous results.

III DATA SUMMARY

The data collected during this project has potentially many applications within the GDOT. It provides valuable information about statewide travel across all modes with particular emphasis on intercity bus travel. Relevant information contained in the data base includes intercity bus passenger usage, socio-economic characteristics of the traveler, mode of travel, travel patterns and trip frequency. Some of this information is exhibited in this section. All of this information has been transferred to the GDOT. No reporting of data collected at the carrier headquarters is given because of the prior agreements made with the carriers.

Terminal Survey

The terminal data were collected by personal interview. A total of 3,200 interviews were collected in Atlanta and Macon. These data are graphically presented in the following figures.

Figure 1 presents the sex (male vs female) distribution of intercity bus patrons. Approximately 51 percent were male and 49 percent female with no significant variation between Greyhound and Trailway.

Figure 2 is a summary of the age distribution. Again there is little difference between the Greyhound and Trailway results. On average without weighing of response totals, 5.4 percent were 17 or under, 57.3 percent between 18 and 30 years old, 29.8 percent between 31 and 60 years old, and 8.8 percent 61 years old or older.

Trip frequency distribution is shown in Figure 3. One to six trips per year accounted for 78 percent on Greyhound and 84 percent on Trailways.

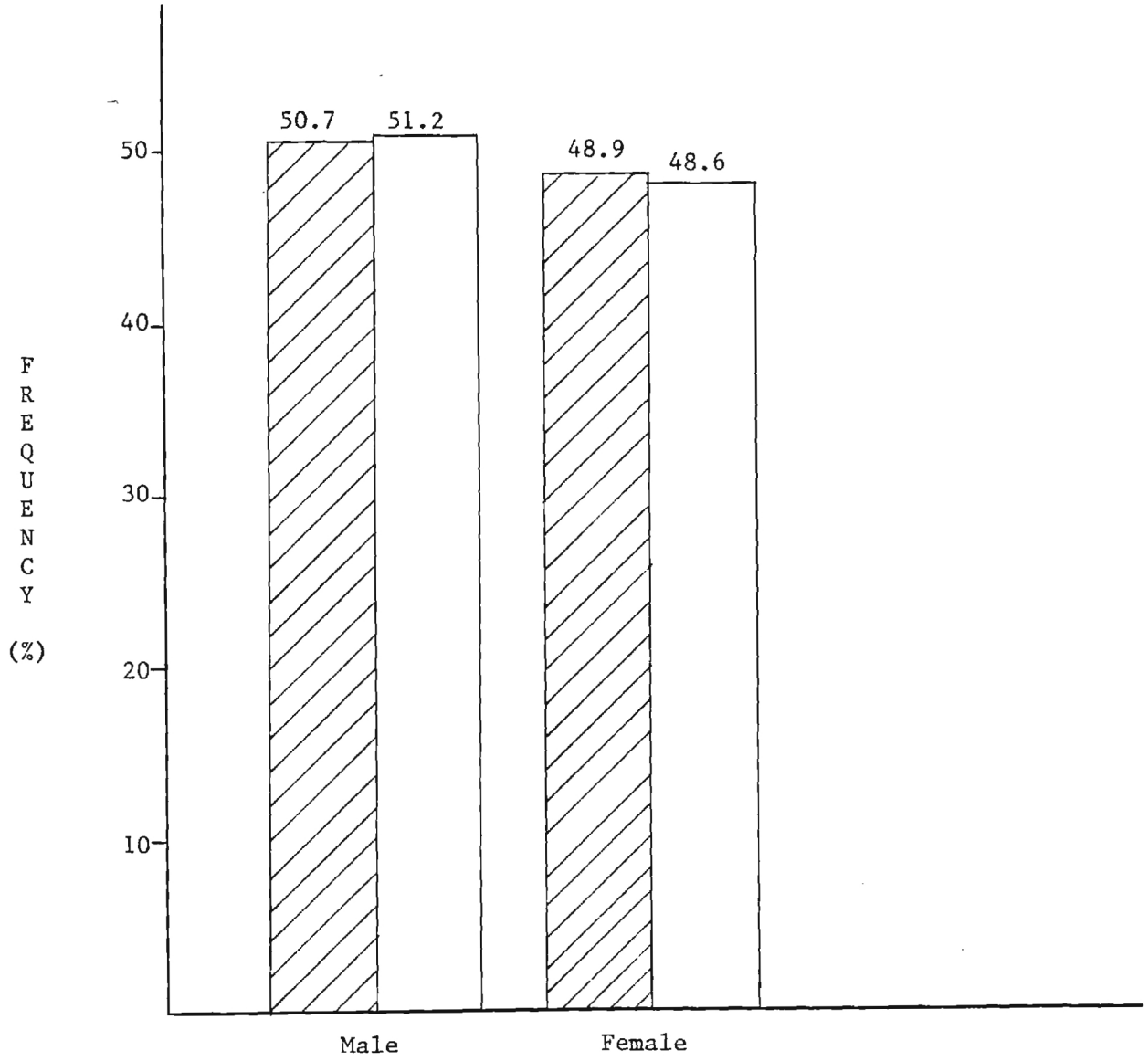

Figure 1: Terminal Survey: Sex Distribution by Carrier

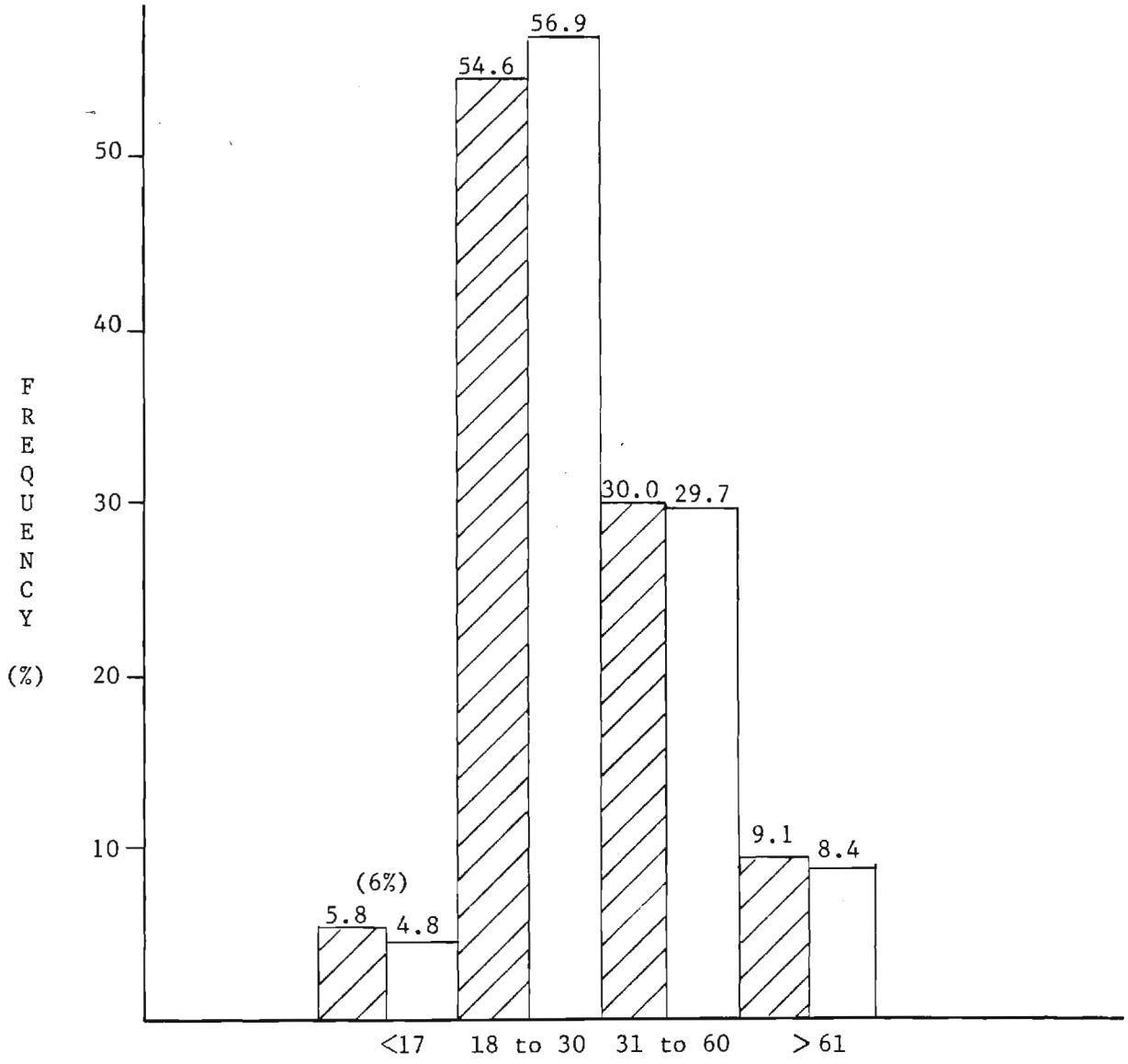

Figure 2: Terminal Survey: Age Distribution by Carrier

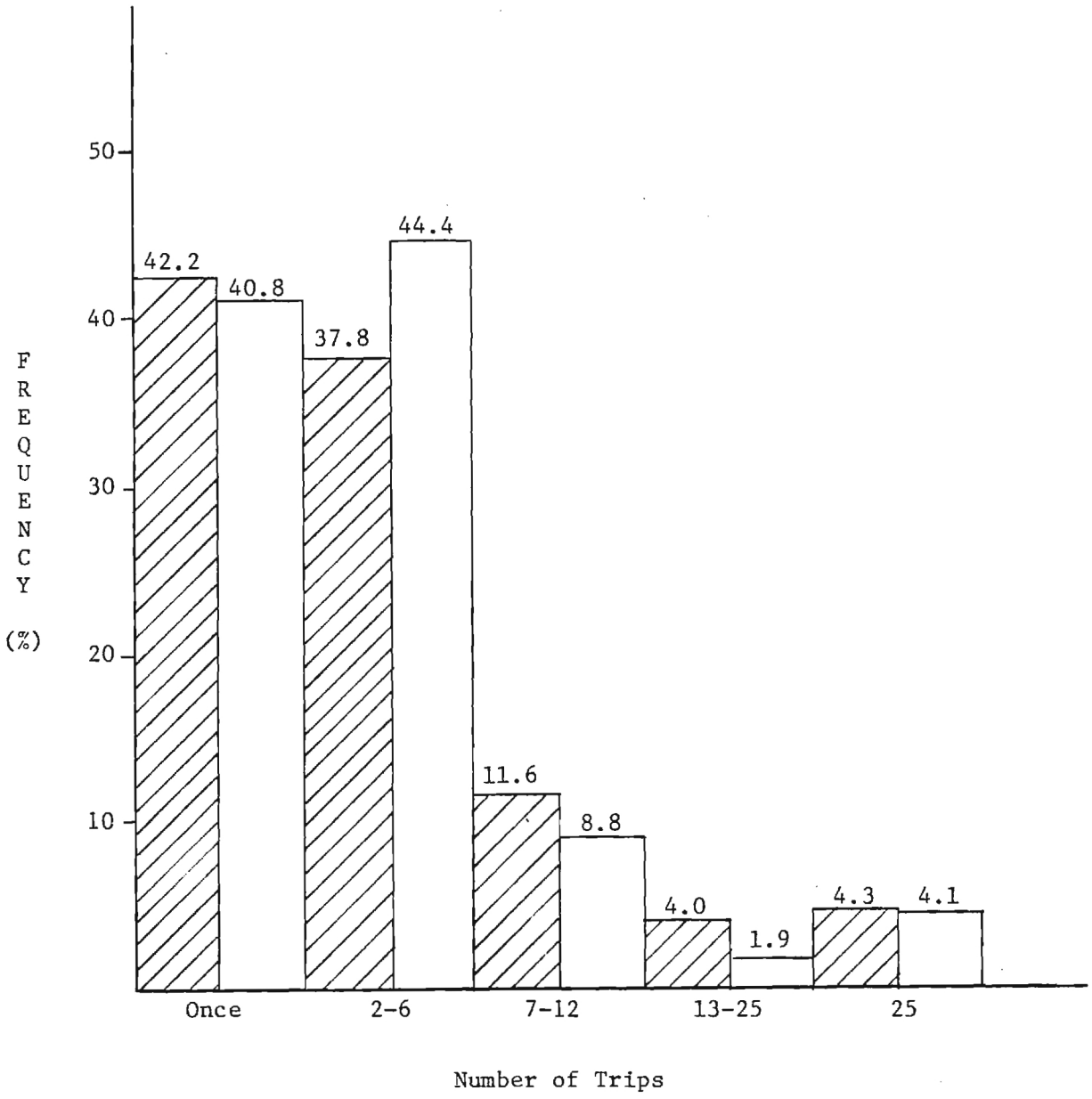

Figure 3: Terminal Survey: Trip Frequency by Carrier

The remainder of the 100 percent is distributed as shown in the figure.

Trip purpose is distributed as shown in Figure 4. The trip purpose of "visit" accounted for approximately forty percent of the travelers. When combined with vacation, this combined category accounted for over fifty percent of the reasons given travel by the intercity bus passengers.

Figure 5 shows the occupation of the intercity bus traveler. The occupation of student at an average of 22 percent followed by professional with approximate average of 16.5 percent accounted for 38 percent of the occupations of the patronage. The high percent of professionals, when compared with other studies, indicates that the respondents did not fully understand the definition of the word professional.

Patronage income distribution is presented in Figure 6. Approximately 40 percent of the respondents indicated that their family income was less than $10,000. Twenty-four percent indicated an income of between $10,000 and $15,000. An income of between $15,000 and $20,000 was indicated by approximately 16 percent. Approximately 80 percent of the respondents indicated that their family income was less than $20,000.

A statistical computation was performed to determine if there was any significant difference between data collected from Greyhound patronage and Trailways passengers. The analysis indicated that there was no significant difference at the 95 percent level of confidence.

It should be noted that passengers using Southeastern Stages are included in the Greyhound figure because Southeastern uses the Greyhound facility in Atlanta. All statistical tests performed on the data including a comprehensive set of cross tabulations of the data have been given to GDOT under separate cover.

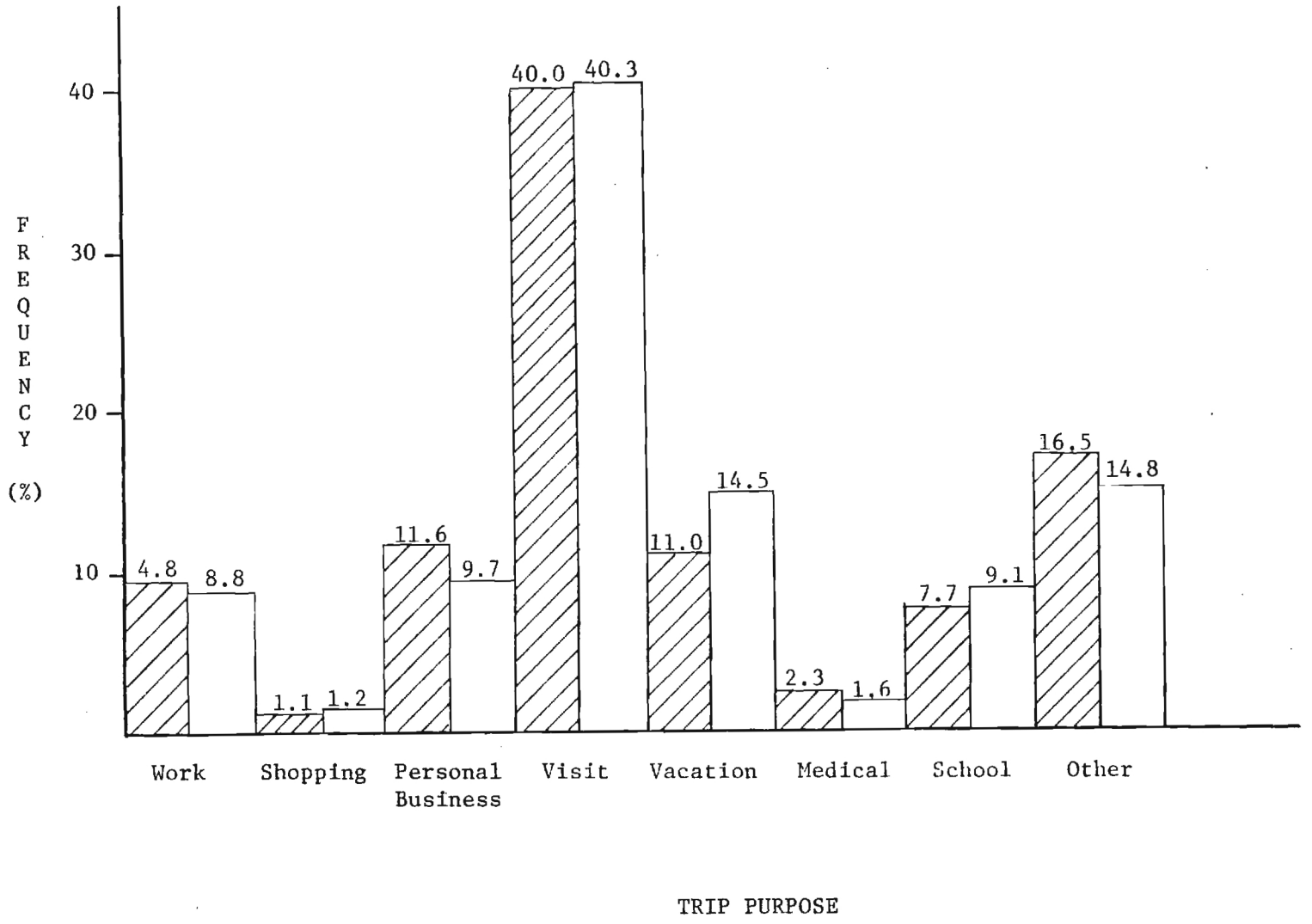

Figure 4: Terminal Survey: Trip Purpose Distribution by Carrier

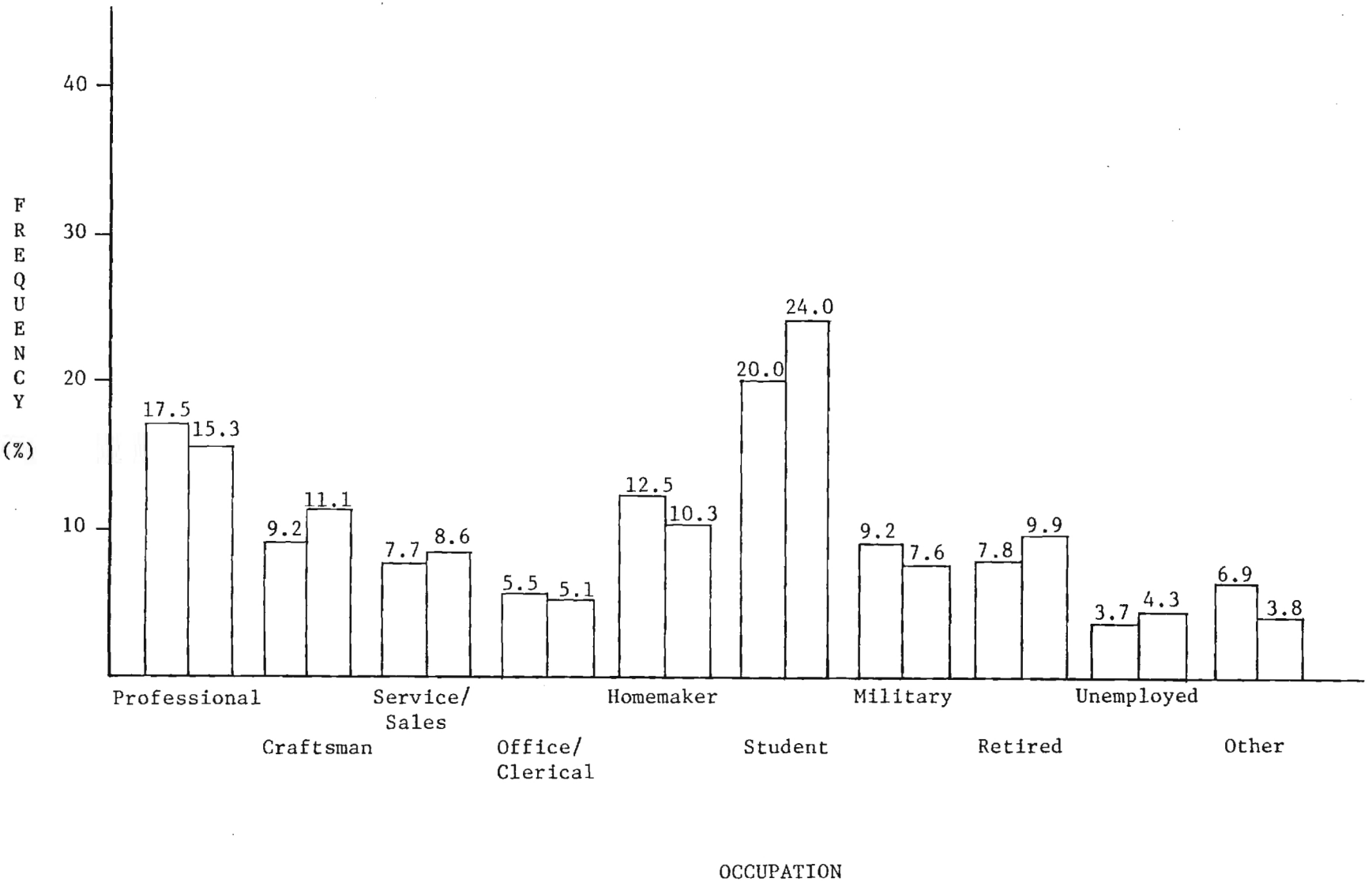

Figure 5: Terminal Survey Occupation Distribution by Carrier

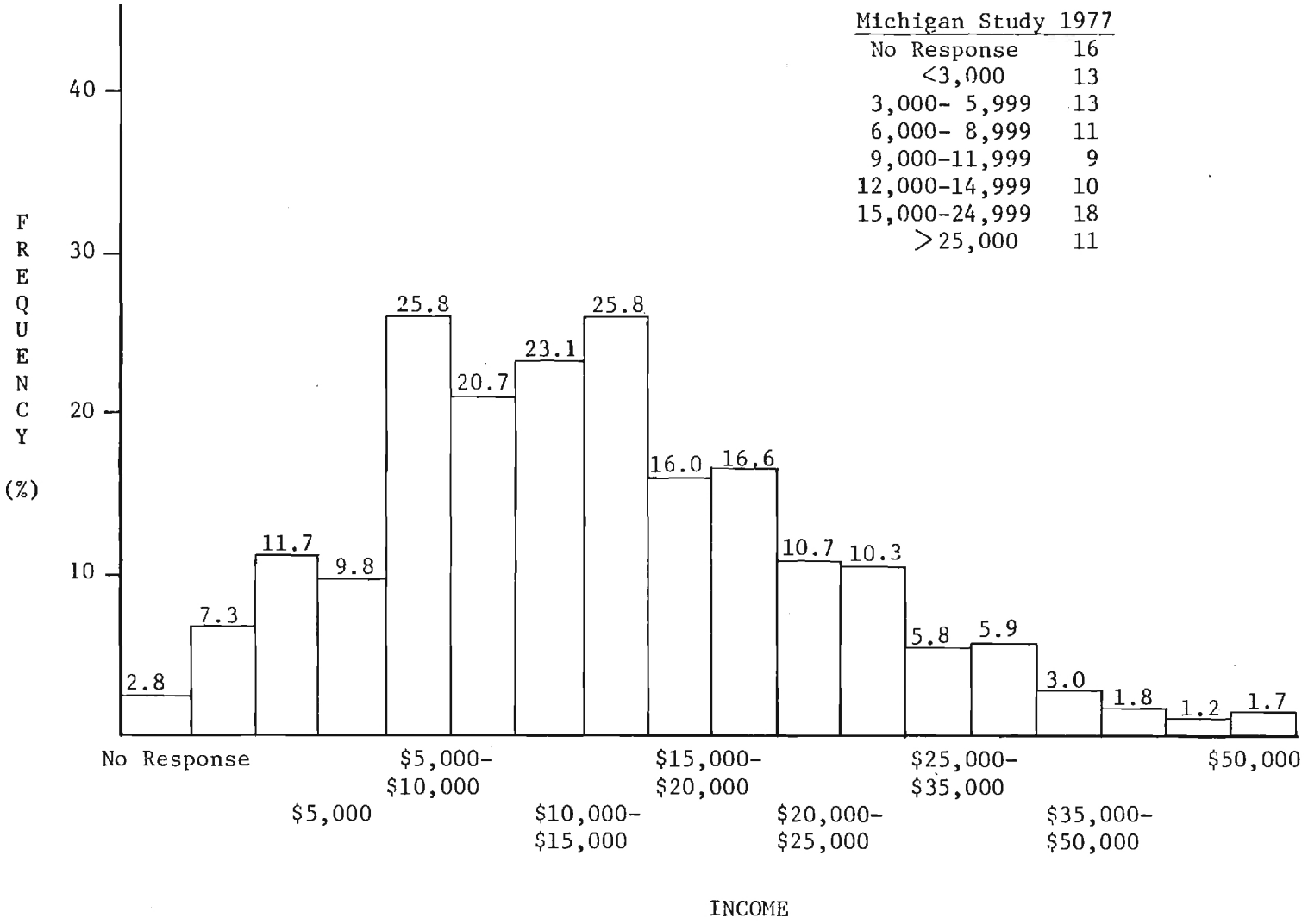

Figure 6: Terminal Survey: Income Distribution by Carrier

Mailout Survey

The applicability of these data have many more potential uses other than the analysis of intercity bus demand analysis. Approximately 44,000 questionnaires were sent out with 5,400 responses (12.3 percent) received. The return rate although low is not surprising. No follow-up analysis such as a non-response survey was made because of limited funds. The following figures are a summary of the mailout survey data.

Figure 7 shows the family size of the respondent. Seventy-two point eight percent of the families had one or two family members. A family size of four or greater was reported by 15.5 percent of the respondents.

Pleasure was indicated by 45.7 percent of the respondents, as shown in Figure 8, for the purpose of the trip. Thirty-two point nine percent reported work as the reason and 21.4 percent indicated other.

Without surprise, 88.1 percent of the respondents indicated that the automobile was the mode of intercity travel. Air was next highest with 9.1 percent followed by intercity bus with 2.4 percent and rail at 0.3 percent. These statistics are shown in Figure 9. The questionnaire defined an intercity trip as one that in fact went from one city to another and was at least five miles long. Over eight thousand trips were reported by the respondents.

Socio-economic data of the respondents is shown in Figures 9, 10 and 11.

The largest age group (28.5 percent) responding to the survey were between 50 and 64 years old as shown in Figure 10. The next largest group was between 30 and 39 years representing 21.8 percent of the respondents. The questionnaire told the respondent to report the age of the household head regardless of who filled out the form.

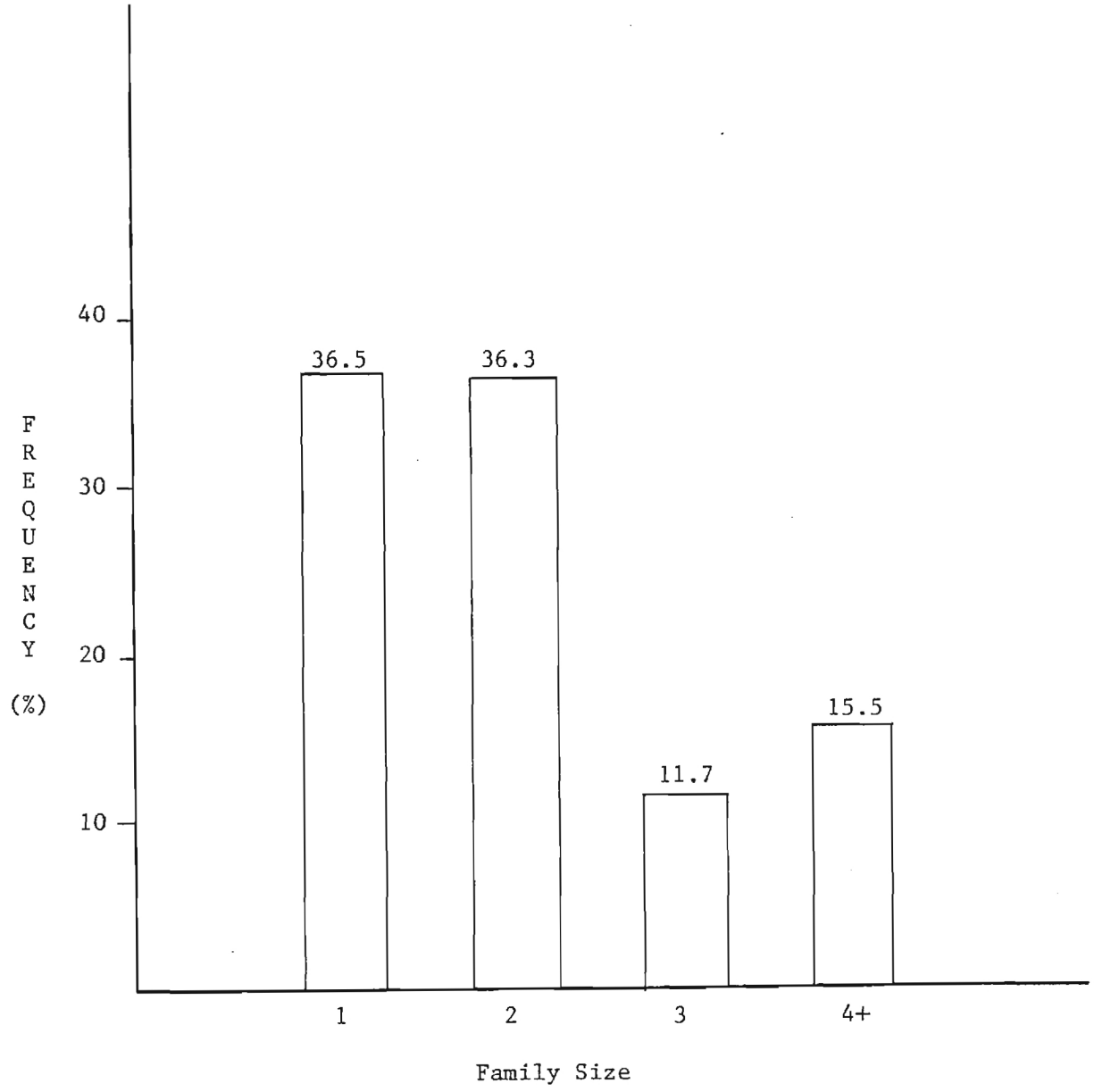

Figure 7: Mailout Survey: Family Size Distribution

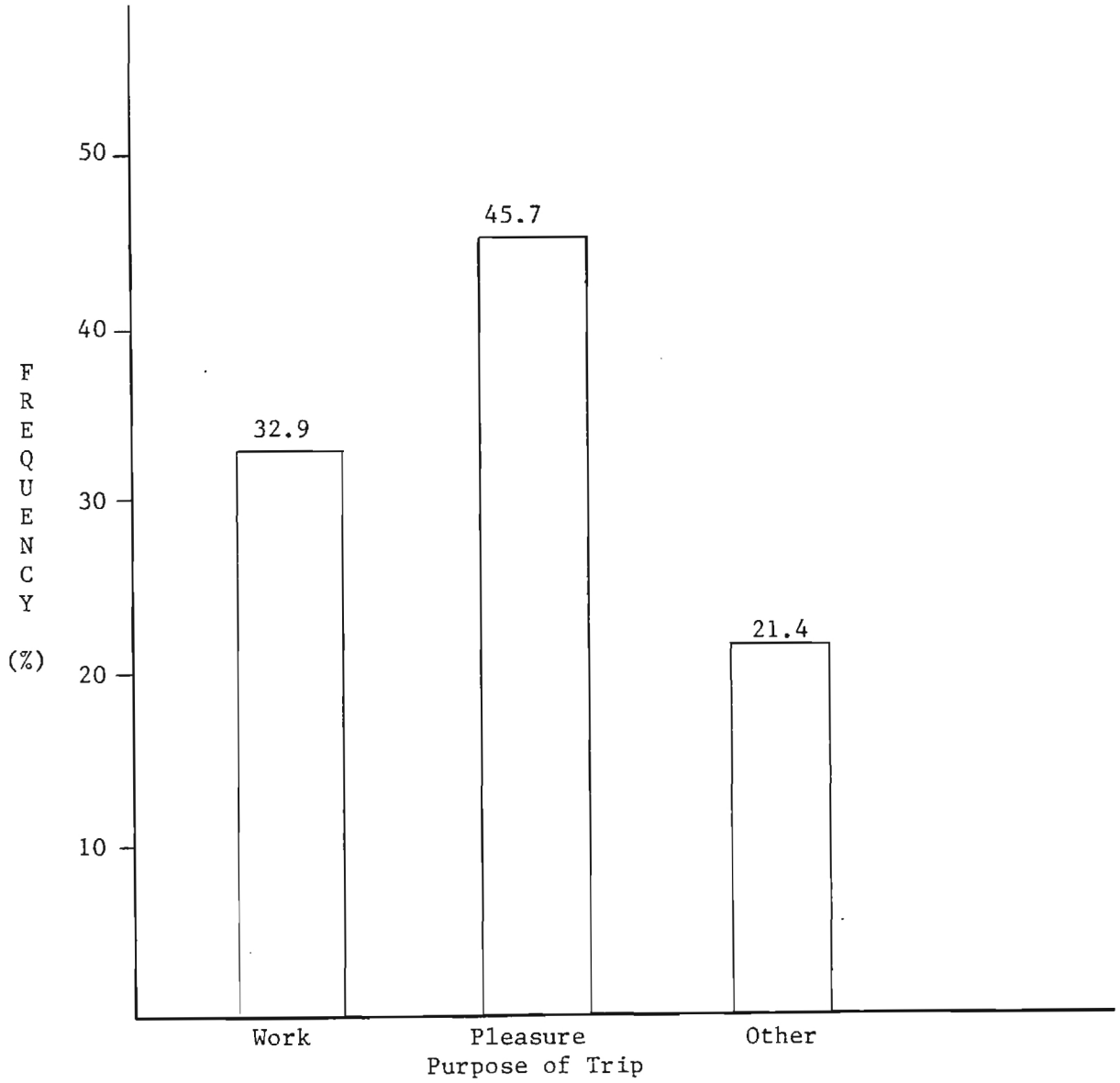

Figure 8: Mailout Survey: Trip Purpose Distribution

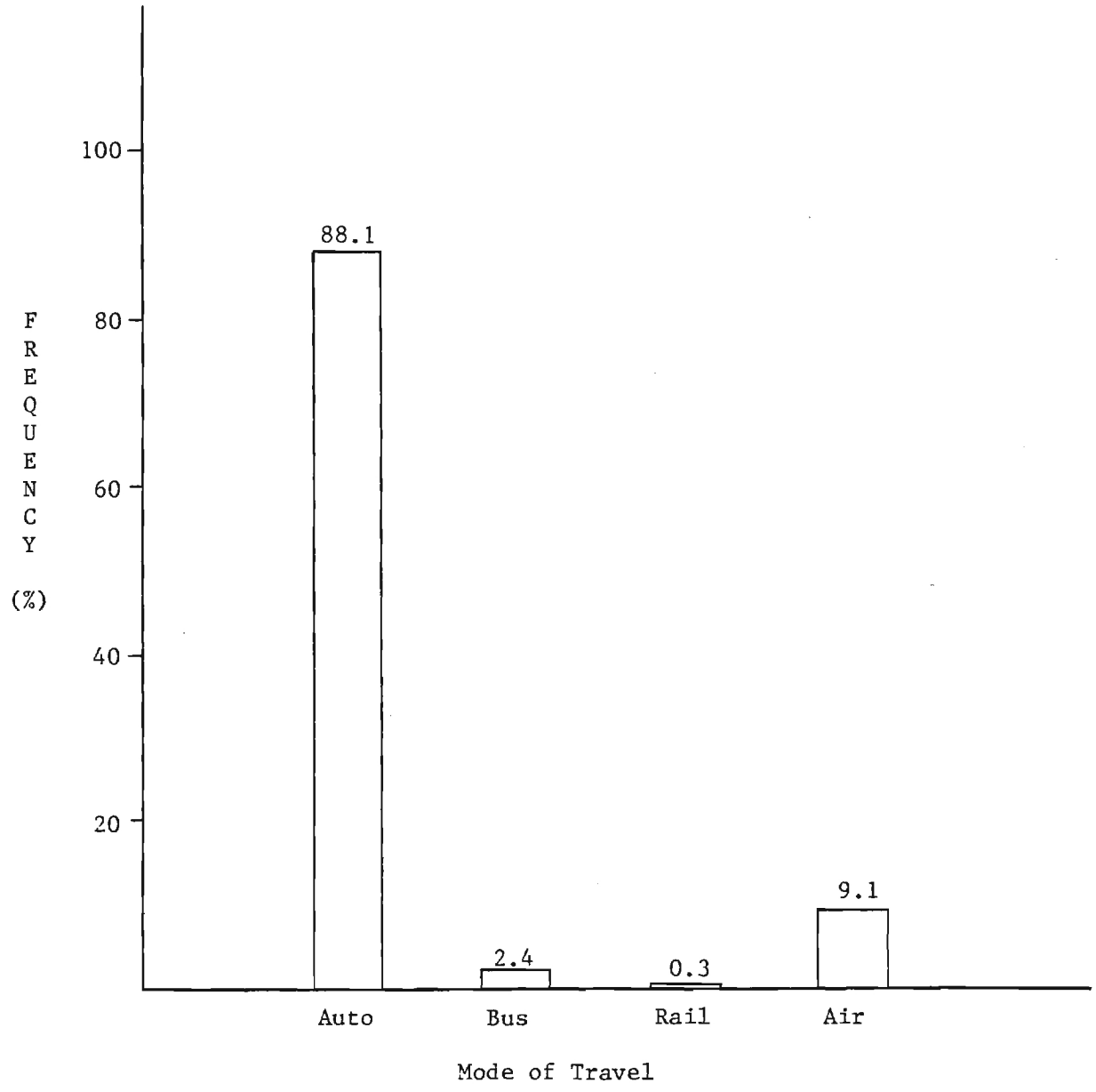

Figure 9: Mailout Survey: Mode of Travel Distribution

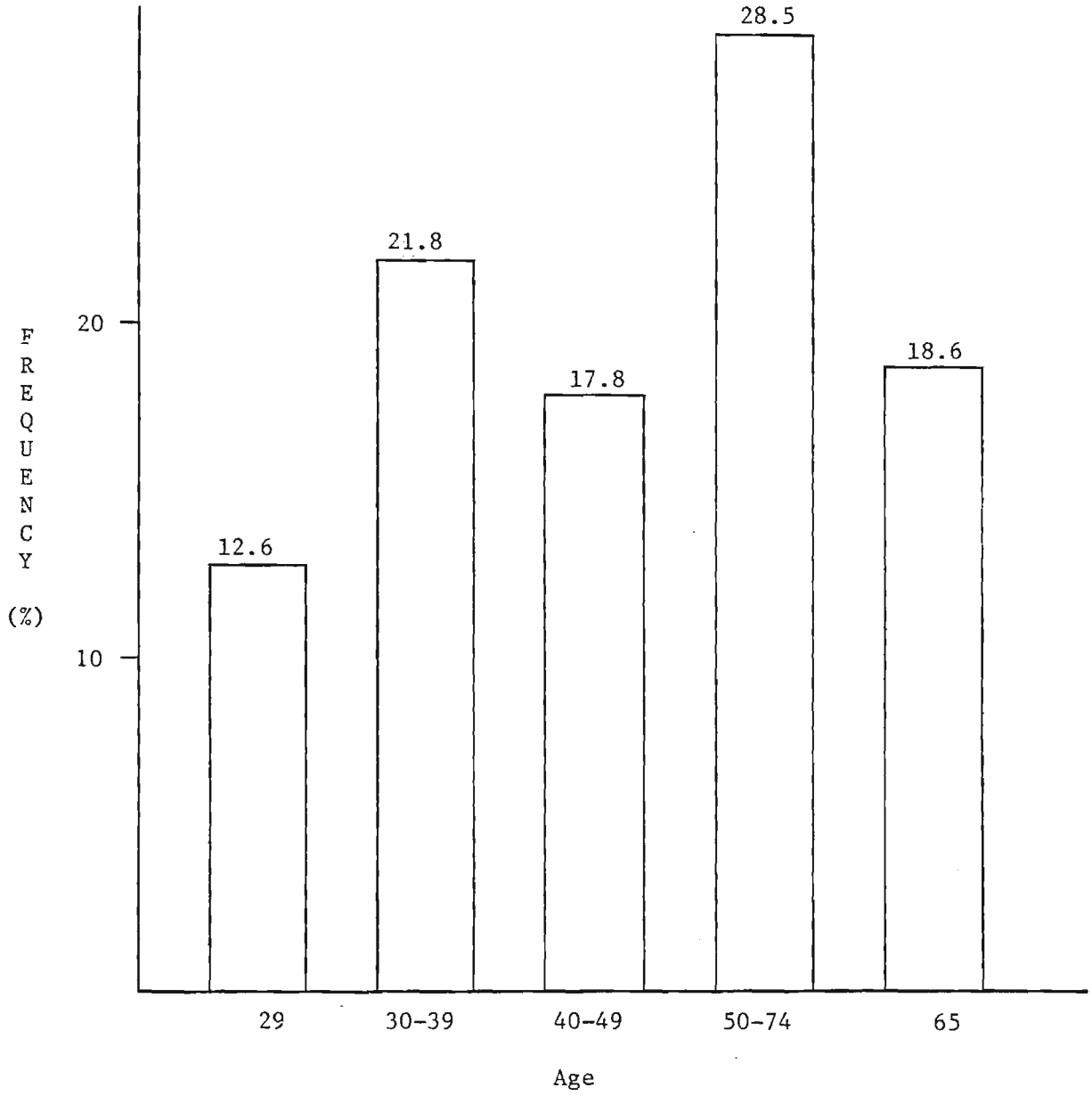

Figure 10: Mailout Survey: Age Distribution

Occupation of the head of household was also requested and the results are shown in Figure 11. Thirty-five point eight percent indicated that they were professionals and 22.5 percent indicated they were retired. Eleven point six percent indicated sales and 10.7 percent indicated craft/labor as the occupation of the household head.

Figure 12 shows a graph of the family income distribution. Fourteen point eight percent indicated an income of less than $10,000. Between $10,000 and $15,000 was reported by 13.6 percent and an income of between $15,000 and $20,000 was reported by 12.0 percent. Forty point four percent reported a family income less than $20,000 as compared to approximately 80 percent in this category in the terminal study.

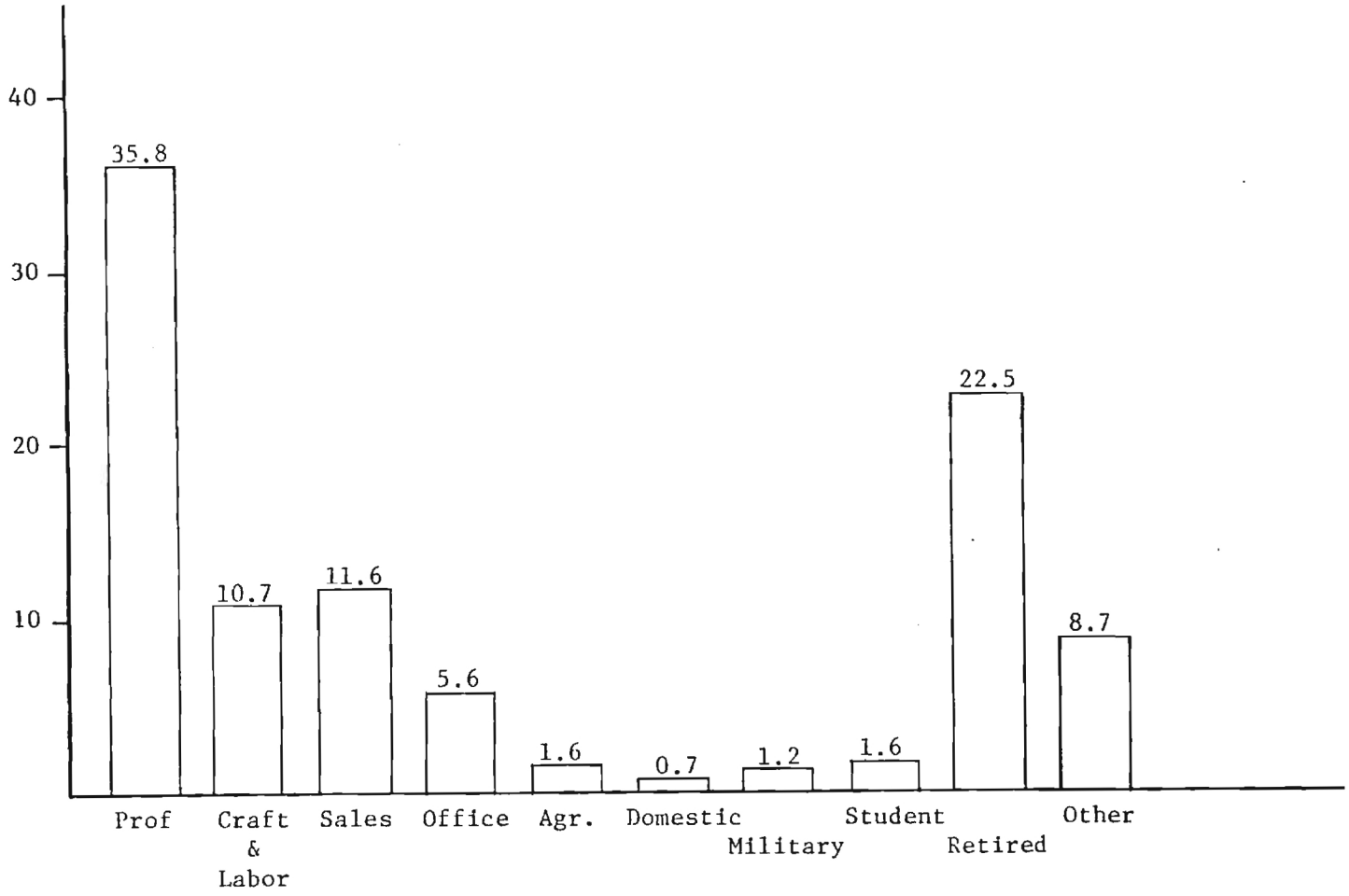

Figure 11: Mailout Survey: Occupation Distribution

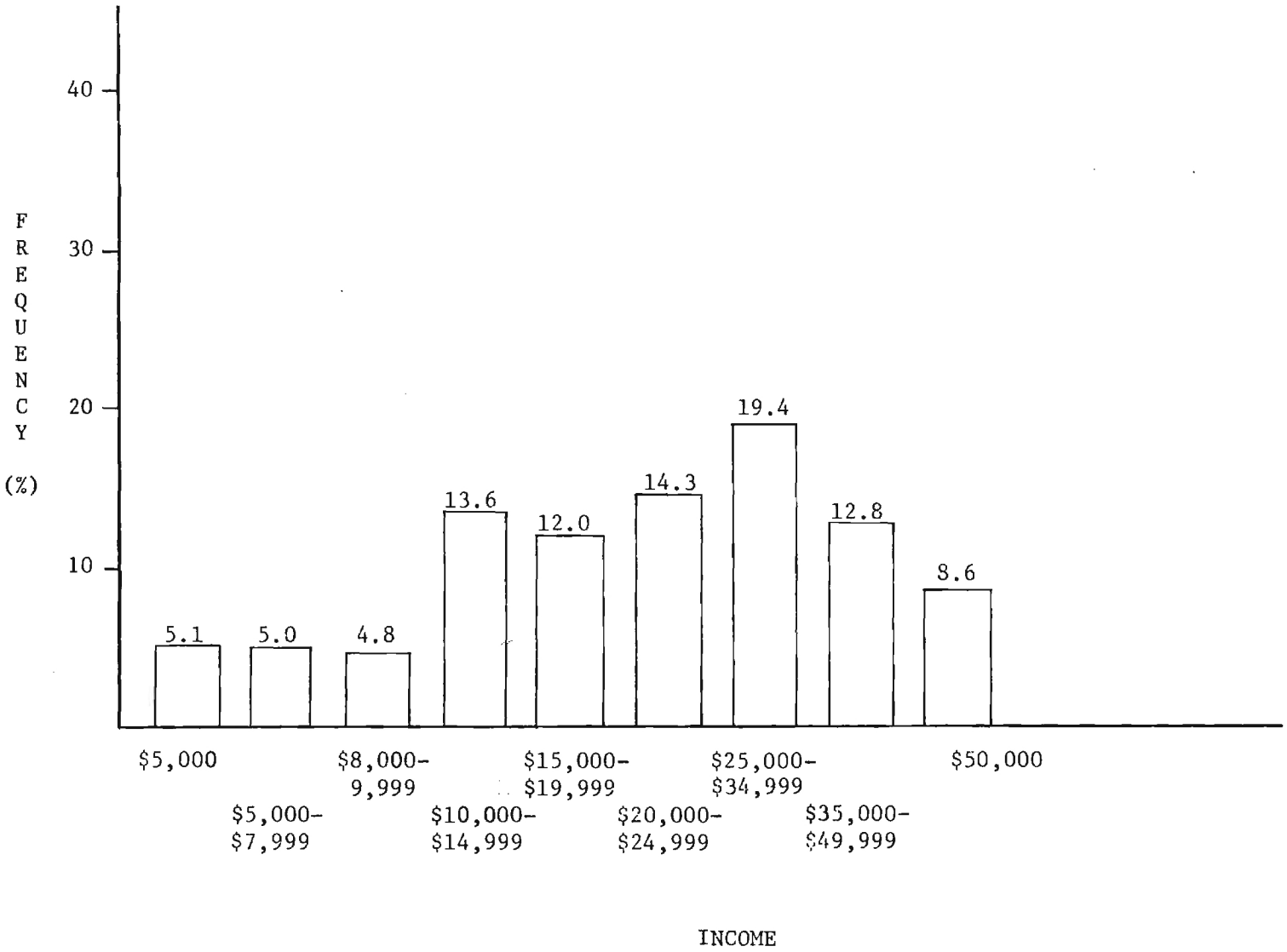

Figure 12: Mailout Survey: Income Distribution

IV CONCLUSIONS

The development of intercity bus demand model did not prove to be acceptable because the model developed was unable to predict demand at a reasonable level of reliability. However, the project produced a significant amount of data that can be applied to the analysis of the intercity bus system and perhaps in other areas. The use of these data can be used to better understand trip patterns, travel design and socio-economic characteristics of the Georgia intercity bus traveler. GDOT has information concerning the origins and destination within the four corridors. These data were not summarized in this report because of the prior agreements made with the carriers.

The preeminent conclusion, based on this effort, the previous effort, and the literature is that the intercity bus system has an intricate and complex operating structure. Although much is understood about this type of bus service, as indicated by the literature, much remains to be understood.